

REMARKS

Applicant has amended the independent claims 28, 56 and 71 to clarify the feature of "sufficiently," as discussed below, in an effort to advance prosecution. Applicant also notes that no amendment made herein was occasioned by the examiner's rejections over the prior art. Applicant's amendments to the claims to address the § 112, ¶2 rejection, do not change the scope and indeed theoretically may broaden the scope of these claims. Accordingly, the next rejection cannot properly be a final rejection.¹

35 U.S.C §112

The examiner rejected Claims 28-48 and 56-82 under 35 U.S.C. 112, second paragraph, as being indefinite. The examiner stated:

5. Claims 28 recites the phrase "determining whether at least some fields.. sufficiently match..." It is unclear what level of matching is required fields to "sufficiently match" For the purposes of applying art, the Examiner will disregard the term "sufficiently."

6. Claims 56 and 71 recite a similar limitation and are rejected for the same reasoning.

7. Claims 29-48, 57-70, and 72-82 are rejected for the same reasons as given above based upon dependency.

Applicant responds that the term "sufficiently"² clearly and distinctly claims the subject matter of the invention. Nonetheless, in order to advance prosecution, Applicant has amended the claims to recite "either match or are substantially close in characteristics to" One of skill in the art would appreciate that a direct match would provide results having a very high level of accuracy, whereas a match that is substantially close in characteristics would provide answers

¹ See 706.07(a)Final Rejection, When Proper on Second Action [R-5]

*** Under present practice, second or any subsequent actions on the merits shall be final, except where the examiner introduces a new ground of rejection that is neither necessitated by applicant's amendment of the claims nor based on information submitted in an information disclosure statement filed during the period set forth in 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p). ***

² Applicant teaches that:

The look-up and retrieval process 94 will look up 112 the received query in the query database 70 by attempting to match the query fields such as airline, flight number/numbers, date, trip origin and destination, sale location and agency. If a stored query is found 114 in the query database 70 that matches the received query or which is substantially close in characteristics to the received query, the process 94 will retrieve 116 the stored answer.

with lower levels of confidence. It would merely be a matter of degree, as to how low in confidence the routineer would desire in setting how close in characteristics the match should be.

Accordingly, the claims as amended particularly point out and distinctly claim the subject matter of the invention.

35 U.S.C § 103

The examiner rejected Claims 28-48 and 56-82 under 35 U.S.C. 103(a) as being unpatentable over Bailis et al., U.S. Patent No. 5,999,946. The examiner stated:

10. As per claim 28, Bailis et al. teach a method of providing a predicted answer in response to a query from a user, the method comprising: retrieving a stored query from a cache that stores queries and answers to queries stored from previously completed queries sent to the system (see column 4, lines 47-49); determining whether at least some fields in the stored query match corresponding fields in the user's query and retrieving an answer corresponding to the stored query from the cache (see column 4, lines 55-58); determining whether the retrieved answer is not stale (see column 4, lines 50-54); and if the retrieved answer is not stale, returning the retrieved answer as the predicted answer to the user's query (see column 4, lines 55-58).

Bailis et al. do not expressly teach said system as an availability system. However the specific data that is being queried does not patentably distinguish the claimed method because such data is non-functional descriptive material. It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the querying of Bailis et al. to any type of commercial database engine (see column 4, lines 15-17), such as that of an airline seat availability system. One of ordinary skill in the art at the time the invention was made would have been motivated to apply the querying as such for the purpose of performing large scale searches more efficiently as suggested by Bailis et al. (see column 1, lines 9-10).

Claim 28 includes the features of : "... retrieving a stored query from a cache that stores seat availability queries and answers to seat availability queries stored from previously completed seat availability queries sent to revenue management systems; determining whether at least some fields in the stored seat availability query either match or are substantially close in characteristics to corresponding fields in the user's seat availability query, retrieving an answer corresponding to the stored query matching the seat availability query from the cache, determining whether the retrieved answer is not stale; and if the retrieved answer is not stale, returning the retrieved answer as the predicted answer to the user's seat availability query..

Bailis discloses:

With reference to FIG. 4, in a live query, a querying client (such as a user of the database 34) creates a standing query which lasts until the query is ended. The client begins by issuing the live query and receiving the appropriate data from the database engine. At this point, the database engine, instead of treating the query as concluded, continues to monitor the database to detect changes to the query results. Should the database change to remove or add records to those that originally met the criteria of the query, the database informs the client of the change. This process continues until the querying client indicates the conclusion of the query.

Another aspect of the present invention addresses query concentration. According to this aspect of the invention, query results are stored by the database engine in local cache. With reference to FIG. 5, the query results may be saved as long as they are considered valid. According to one embodiment, the validity of the cached data is determined by the amount of time that has passed since the original query results were obtained. The duration of such a time period can be determined empirically for a given system.

For as long as the data is valid, the database engine supplies subsequent, identical queries with the data from cache instead of reexecuting the search of the database that originally produced the cached results. Such subsequent querying clients may be either the same client that issued the original query or a different client. If a different client makes the subsequent query, the database engine may redirect the query to the initial client to provide the data. The timer which is used to determine data validity may be programmable. A programmable timer would allow the database to adjust dynamically to changing conditions.

Without giving any consideration to the travel related features and the problem domain that Applicant's invention addresses, claim 28 still distinguishes over Bailis.³

Claim 28 includes the novel and non-obvious features of : "... retrieving a stored query from a cache that stores ... queries and answers to ... queries stored from previously completed ... queries sent to ... systems; determining whether at least some fields in the stored ... query either match or are substantially close in characteristics to corresponding fields in the user's ... query, retrieving an answer corresponding to the stored query matching the ... query from the cache, determining whether the retrieved answer is not stale; and if the retrieved answer is not stale, returning the retrieved answer as the predicted answer to the user's ... query.

The examiner argues that: "Bailis et al. teach a method of providing a predicted answer in response to a query from a user," Applicant disagrees. Bailis clearly is directed to a database management system that uses a cache to speed-up processing. However, there is no aspect of prediction involved in the Bailis system. Bailis teaches to query the cache for the exact constraints that are imposed on the results by the query, whereas Applicant's claim 28 requires: "determining

³ Applicant asserts that the examiner must give patentable weight to all claim limitations. However, in view of the distinctions present in claim 28, without consideration given to the travel related features it is unnecessary for Applicant to address those features here. See also Applicant's discussion below for claims 36 and 37.

whether at least some fields in the stored ... query either match or are substantially close in characteristics to corresponding fields in the user's ... query."

The examiner also argues that Bailis teaches: "retrieving a stored query from a cache that stores queries and answers to queries stored from previously completed queries sent to the system (see column 4, lines 47-49);" Applicant disagrees. Bailis clearly does not teach this feature of claim 28. This feature requires that the cache stores the queries and the answers to the queries. Bailis however, does not teach to store queries in the cache, whether at Col. 4, lines 47-49 or elsewhere. Rather, at that excerpt Bailis only teaches to store query results, i.e., the answers to the queries. Nowhere does Bailis teach to store queries and the query results. This is not needed for Bailis's system, because Bailis is not seeking a prediction of an answer, but the actual answer to the query.

In contrast, claim 28 is seeking a prediction and thus not only does the query results need to be stored, so too do the queries, in order that the system can assure that the answers returned for a query would be sufficiently close in characteristics to the query that resulted in the answer in the first instance.

The examiner also argues that Bailis teaches: "determining whether at least some fields in the stored query match corresponding fields in the user's query and retrieving an answer corresponding to the stored query from the cache (see column 4, lines 55-58)" Applicant disagrees. Bailis clearly does not teach this feature of claim 28. Rather, Bailis teaches "For as long as the data is valid, the database engine supplies subsequent, identical queries with the data from cache instead of reexecuting the search of the database that originally produced the cached results." Bailis, thus does not meet the feature of determining whether at least some of the field in the stored query match corresponding fields in the user's query. Bailis is only operative for returning answers for identical queries.⁴

Thus, for at least the above reasons claim 28 is allowable over Bailis.

Claim 56, the computer program product analog of claim 28, includes the features ... a predicted answer ... and instructions ... to retrieve a stored query from a cache that stores ... queries and answers ... from previously completed ... queries ... determine whether at least some fields in the stored ... query either match or are substantially close in characteristics to corresponding fields in the ... query, return the retrieved answer as the predicted answer to the

⁴ Bailis Col. 4, line 56.

... query. Claim 71, the computer system analog to claim 28, is allowable for analogous reasons as those given for claims 28 and 56.

Claims 29, 30 and 36

In rejecting these claims, the examiner uses essentially the same rationale to avoid examining the limitations of the claims and to avoid according patentable weight to the stated limitations of those claims. Claim 36 is illustrative.

Claim 36 calls for "... determining a threshold time ... comprises determining a threshold time according to one or more query factors, said query factors including a date of a flight, an origin of a flight, a destination of a flight, a time of flight, a day of week per flight, a size of the airplane, an actual answer to a completed query that matches the seat availability query and an actual answer to a completed query that does not match the seat availability query."

In rejection of claim 36, the examiner argued:

18. As per claim 36, Bailis et al. teach the method of claim 35 as described above. Bailis et al. do not expressly teach determining a threshold time according to one or more query factors, said query factors including a date of flight, an origin of a flight, a destination of a flight, a time of flight, a day of week per flight, a size of the airplane, an actual answer to a completed query that matches the seat availability query and an actual answer to a completed query that does not match the seat availability query. However these differences are only found in the non-functional data stored in the database. Data identifying a date of flight, an origin of a flight, a destination of a flight, a time of flight, a day of week per flight, a size of the airplane, an actual answer to a completed query that matches the seat availability query and an actual answer to a completed query that does not match the seat availability query is not functionally related to the substrate of the method. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to store any data in the database of the method of Bailis et al. because such data does not functionally relate to the substrate of the method and merely labeling the data differently from that in the prior art would have been an obvious matter of design choice.

Applicant disagrees. Data when it is functionally related to its substrate must be accorded patentable weight.⁵

⁵ The Federal Circuit in *In re Lowry*, 32 F.3d 1579, 32 USPQ2d 1031 (Fed. Cir. 1994) set forth guidelines to be applied by the patent office in determining whether recited subject matter is functionally related to the substrate. The Federal Circuit noted that: "Lowry disclosed a data structure accessible by many different application programs. Lowry's data structure was based upon the 'Attributive data model.' The Attributive data model represents complex

Accordingly, claim 36 is directed to a method that uses characteristics of the query factors, here in the problem domain of airline travel planning, to ascertain when to indicate that the stored results are stale. The claim therefore does not encompass non-functional descriptive material, because the data characteristics materially modify the nature of the processing performed by the claimed method. Moreover that data does not encompass non-functional descriptive material such as music, literature, art, photographs and mere arrangements or compilations of facts or data, because the features of claim 36 provide a functional interrelationship between the data and the substrate, i.e., method that examines the characteristics of the data in order to affect the processing in the method.

Claim 31

Claim 31 further limits claim 28 and recites that "... determining whether at least some of the fields of a stored query matches the user's seat availability query ... comprises parsing the user's availability query into query fields and matching the query fields of the availability query to the query fields stored in the cache database."

The examiner argues that:

As per claim 31, Baillis et al. teach the method of claim 28 as described above, wherein determining whether at least some of the fields of a stored query matches the user's query further comprises: matching the query fields of the query to the query fields stored in the cache database (see column 4, lines 55-58). Baillis et al. do not expressly teach parsing the query into query fields. Official notice is taken that parsing data is old and well known in the art. It would have been obvious to one of ordinary skill in the art at the time the invention was made to parse the query for the purpose of convenient prediction analysis.

information in terms of attributes and relationships between attributes." *Lowry* F.3d at 1582. After acknowledging that the Board of Patent Appeals and Interferences had reversed the examiner's rejection of Lowry's data structure claims under 35 U.S.C. 101 because Lowry recited a memory, an article of manufacture and a class of invention specifically prescribed by 35 U.S.C. 101, the court turned to the Board's printed matter rejection of those claims. In reversing the Board, the Federal Circuit stated:

More than mere abstraction, the data structures are specific electrical or magnetic *1584 structural elements in a memory. According to Lowry, the data structures provide tangible benefits: data stored in accordance with the claimed data structures are more easily accessed, stored, and erased. Lowry further notes that, unlike prior art data structures, Lowry's data structures simultaneously represent complex data accurately and enable powerful nested operations. In short, Lowry's data structures are physical entities that provide increased efficiency in computer operation. They are not analogous to printed matter. The Board is not at liberty to ignore such limitations.

Applicant does not challenge the notion that parsing data is old and well-known. However, the novelty of claim 31 over Bailis resides in combination of features namely “determining whether at least some of the fields of a stored query matches the user’s seat availability query ... comprises parsing the user’s availability query into query fields and matching the query fields of the availability query to the query fields stored in the cache database.” Bailis neither describes nor suggests determining whether at least some of the fields match. As explained above Bailis looks for identical queries. Moreover, Bailis does not even have an analog of the step of “matching the query fields of the availability query to the query fields stored in the cache database.” Bailis as discussed above does not store “the availability query ... in the cache database.” Accordingly claim 31 further distinguishes over Bailis.

Claims 32 and 33

Claim 32 includes the feature of: “... exactly matching the query fields in the query to the query fields of a query stored in the cache” and claim 33 requires: “... approximately matching the query fields in the query to at least some of the query fields of a query stored in the cache.”

Each of these claims are patentably distinguished over Bailis because claim 32 requires “...the query fields of a query stored in the cache.” Bailis does seem to require an exact match, but as set out above does not teach that a query is stored in the cache. Claim 33 further distinguishes because it requires “... approximately matching the query fields in the query to at least some of the query fields of a query stored in the cache.” Bailis does not allow for approximately matching, and does not teach that a query is stored in the cache.

Claim 34

Claim 34 is not anticipated by Bailis, because Bailis neither describes nor suggests “... if the retrieved answer is stale, sending an actual query to the system, returning the actual answer received from the system to the user and storing the actual answer and query in the cache database. The examiner contends that this claim is taught at column 4, lines 8-14 and column 4, lines 47-49 of Bailis. Bailis at column 4, lines 8-14 discusses operation of the call processing

system, not the cache and at lines 47-49 Bailis discusses query concentration where query results are stored by the database engine in the local cache. Nowhere however does Bailis teach a mechanism that "... if the retrieved answer is stale, sending an actual query to the system, returning the actual answer received from the system to the user and storing the actual answer and query in the cache database."

Claims 35 is allowable at least for the reasons discussed in conjunction with its base claim 30.

Claims 37-44

In rejecting these claims, the examiner uses essentially the same rationale to avoid examining the limitations of the claims and to avoid according patentable weight to the stated limitations of those claims. Claim 37 is illustrative.

Claim 37 calls for the features of: "...returning the retrieved answer as the predicted answer where the predicted answer includes a confidence factor corresponding to the predicted answer; and accepting the predicted answer, or not, based on the confidence factor.

The examiner argues that:

19. As per claim 37, Bailis et al. teach the method of claim 28 as described above, wherein returning the retrieved answer as the predicted answer to the user's query further comprises: determining that the retrieved answer from the cache database is stale (see column 4, lines 50-54). Bailis et al. do not expressly teach including a confidence factor corresponding to the predicted answer. However this difference is only found in the non-functional data stored in the database. Data identifying a confidence factor is not functionally related to the substrate of the method. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to store any data in the database of the method of Bailis et al. because such data does not functionally relate to the substrate of the method and merely labeling the data differently from that in the prior art would have been an obvious matter of design choice.

Applicant disagrees. The "confidence factor" is functionally related to its substrate, i.e., the method and therefore must be accorded patentable weight based on the rationale of *In re Lowry* discussed above.

Claim 37 is directed to a method that uses the confidence factor to ascertain whether or not to accept the predicted answer as the answer to the user query. The claim features are all entitled to patentable weight, because the confidence factor materially modifies the nature of the processing performed by the claimed method. The confidence factor does not encompass non-functional descriptive material such as music, literature, art, photographs and mere arrangements or compilations of facts or data. Rather, it is a factor that must be considered by the method in claim 37 to affect the remaining processing of the claim. The features of claim 37 provide a functional interrelationship between the factor and the substrate, i.e., method that examines the factor in order to affect the processing of the method.

Claims 38-44 are allowable because Bailis fails to suggest the features of those claims and the examiner must accord those features patentable weight.

Claims 45-45

These claims further distinguish over Bailis because Bailis neither describes nor suggests "... predicting produces a confidence factor according to a model using as a factor in the model a threshold time, which if lapsed, indicates that the retrieved answer is considered stale."

The examiner argues that:

27. As per claim 45, Bailis et al. teach the method of claim 42 as described above, wherein predicting produces a confidence factor according to a model using as a factor in the model a threshold time, which if lapsed, indicates that the retrieved answer is considered stale (see column 4, lines 50-54).

Bailis does not teach the confidence factor as set out and admitted by the examiner above. Bailis also does not use a model to indicate when the answer is considered stale. Bailis mentions that the time period can be determined empirically⁶, and that timer can be programmable⁷ but does not mention that any model is involved in determining the when an answer is considered stale.

Claims 46-48 are allowable because Bailis fails to suggest the features of those claims and the examiner must accord those features patentable weight.

⁶ Bailis Col. 4, line 54.

⁷ Id. lines 64-65.

Claims 56-82 directed to a computer program product and a system are allowable for analogous reasons as those given above for corresponding ones of claims 28-48.

It is believed that all the rejections and/or objections raised by the examiner have been addressed.

In view of the foregoing remarks, applicant respectfully submits that the application is in condition for allowance and such action is respectfully requested at the examiner's earliest convenience.

All of the dependent claims are patentable for at least the reasons for which the claims on which they depend are patentable.

Canceled claims, if any, have been canceled without prejudice or disclaimer.

Any circumstance in which the applicant has (a) addressed certain comments of the examiner does not mean that the applicant concedes other comments of the examiner, (b) made arguments for the patentability of some claims does not mean that there are not other good reasons for patentability of those claims and other claims, or (c) amended or canceled a claim does not mean that the applicant concedes any of the examiner's positions with respect to that claim or other claims.

Please charge the Petition for Extension of Time fee of **\$460.00** and please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: December 20, 2007

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